

National Geodetic Survey (NGS) Capabilities to Support NOAA Coastal Storms Initiative

NGS defines and maintains the National Spatial Reference System (NSRS), the national coordinate system which provides the essential infrastructure that specifies latitude, longitude, height, scale, gravity, and orientation throughout the nation. A critical aspect of the NSRS for hazard mitigation is the vertical datum by which heights are defined and related to local water levels. NGS conducts ongoing height modernization efforts throughout the country to improve coastal and inland elevations and provide essential infrastructure to enhance community resiliency.

Height Modernization is important for calculation of local relative sea level rise; storm surge modeling; flood plain mapping; crustal motion monitoring; and restoration of coastal habitats. One of the critical uses of height modernization projects is to measure rates of subsidence, or land sinking which, in coastal areas, influences local rates of relative sea level rise. In many areas, the only way to escape an incoming hurricane is to follow specific **hurricane evacuation routes**. Accurate elevation information for the roads in relation to local water levels is critical for helping residents avoid getting trapped in fast-rising water when they are trying to leave during an emergency. NGS has recently updated height information for Louisiana for FEMA and US Army Corps of Engineers.

In coordination with federal partners and state and local governments, NGS **conducts damage assessment flights** in response to National emergencies such as hurricanes. NOAA uses the imagery to identify areas of shoreline change and marine infrastructure damage, assist nautical charting efforts, respond to hazardous material and oil spills, validate hurricane models, and conduct damage assessments. The imagery is also used to assess storm impacts to habitats within National Estuarine Research Reserve Systems (NERRS) and National Marine Sanctuaries (NMS).

NGS research into **improving the accuracy of elevation measurements of coastal ecosystems** will enhance the accuracy of coastal flooding models and increase their effectiveness at protecting lives and property. NGS guidelines and procedures for **monitoring elevations of coastal ecosystems** that serve as natural barriers will provide vital support to preserve and restore these ecosystems and in turn protect coastal communities in the face of accelerating sea level rise. Proposed NGS research into new laser surveying methodologies could **provide volume calculations for soil erosion** mobilized by coastal storms.

NGS surveys the Nation's coastal regions to **provide an accurate, consistent, up-to-date national shoreline**. The shoreline depicted on NOAA's nautical charts approximates the line where the average high tide, known as Mean High Water (MHW), intersects the coast. NOAA shoreline mapping also provides the line where Mean Lower Low Water (MLLW) intersects the coast. This information is critical for navigation safety as well as planning for the management of coastal resources and communities. For previous coastal storms efforts, NGS has played a role in **acquiring, critiquing, and analyzing various elevation data sets** for the creation of a combined Digital Elevation Model (DEM), using LiDAR, Shuttle Radar Topographic Mission (SRTM) Data, and USGS Digital elevation data.

- NOAA05-R499-03 Press release, NOAA EMPHASIZES IMPORTANCE OF USING NEW ELEVATIONS IN LOUISIANA RECONSTRUCTION, RECOVERY PROJECTS Provides Critical Update on South Louisiana Elevation Surveys.
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